MUNICIPAL REFERENCE

Environmental Health
PCBs

MEMORANDUM

CITY OF TORONTO

TO Dr. G.W.O. Moss, Medical Officer of Health

FROM G. L. Caplan, P.S.A.U.

DATE March 28, 1980

SUBJECT PCBs and Program Support and Advocacy Unit

METROPOLITAN TORONTO CENTRAL LIBRARY
Municipal Reference
MAY 21 1982

I am forwarding a report on PCB disposal, as requested by the Board of Health, prepared by our researcher, Janis Sarra. In my view the report is the best single summary document available to explain what PCBs are, why they are a hazard, why disposal has proved so awkward, and what steps ought now to be taken by the appropriate authorities.

Those authorities are largely the federal and provincial environment ministries. The Board can, as it often does, endorse our thoughtful recommendations and send them along to Messrs. Roberts and Parrott. It can also ask this Unit to lobby those ministers and their advisors more actively. Before doing so, however, we believe we should ask ourselves why we expect our representation to have an especial impact on this matter, in view of the widespread interest that already exists. Does it make sense for us to expend scarce personnel resources unless we can reasonably expect our intervention to make a difference?

We have asked ourselves the following questions in order to make this judgment:

1) Is the issue being neglected by others? Obviously not: beside widespread media coverage and political involvement, the Appendix of the attached report indicates that many organizations are actively concerned with the PCB disposal issue.

2) Are there conflicting opinions on the issue to which the Board of Health's authority would add decisive weight? Apparently not, at least not in the way that characterized the mammography controversy, for example.

3) Has the Board or Department especially close ties with the pertinent decision-makers so that its voice would command attention? Not yet, alas.

Other criteria and guidelines could be suggested. However, since the response to each of the above is negative, we believe it does not make sense for the Advocacy Unit to attempt a more active lobby on this matter. We believe the Board should forward our recommendations to the two ministers, but that the Advocacy Unit should be asked to study the larger, general question of creating environmental guidelines by which its future activities should be determined. If the Board agrees, we would soon present criteria which will allow the Board and the Department to make considered judgements as to when the resources of the Advocacy Unit should be brought into play.

Gerald L. Caplan
Program Support & Advocacy Unit
GLC/el

encl.

DISPOSAL OF LIQUID PCBs

Introduction:

The Local Board of Health asked us to report on problems relating to safe disposal of polychlorinated biphenyls (PCBs). This was undertaken with the realization that PCBs are but one of thousands of toxic chemicals in our environment which pose a threat to modern health. The current judicial proceedings in Mississauga regarding approval of a cement kiln incineration plant at St. Lawrence Cement have clearly raised the question of safe PCB disposal in the public's mind. In this report we focus on the surrounding factors relating to the cement kiln process, including transportation, regulation and monitoring of health effects.

Method of Inquiry:

The extensive involvement of many organizations in the PCB disposal debate has created a large body of literature, to which we referred continually. Key sources utilized were the federal Environmental Protection Agency, the National Research Council, the provincial Ministries of the Environment, Health and Labour, the Ontario Research Foundation, the World Health Organization, and a number of articles in environmental and health journals. We consulted also with the Canadian Environmental Law Association, Pollution Probe, members of the University of Toronto and Guelph University faculties, and legal counsel for the Municipality of Mississauga, in an attempt to gather all of the most pertinent information relating to public health and the disposal of liquid PCBs.

PCB Composition and Use:

Polychlorinated Biphenyls are a class of chemical compounds, manufactured through some 200 different combinations of chlorine and biphenyl.[1] Their

commercial mixtures may contain up to 80 different compounds.[2] PCBs are known largely by their trade names: Askarel, Aroclor, Kaneclor, Asbestol, Diaclor, Inerteen and many others named in the Regulations under the Environmental Contaminants Act.[3] Their chemical properties include a resistance toward combustion at high temperatures, dielectric (insulating) qualities, a stability towards oxidization, insoluability in water and high soluability in organic compounds.[4]

These characteristics are responsible for the widespread commercial use of PCBs since the 1930's in such products as varnishes, textile coatings, carbonless copying paper, microscope immersion oils, and as dielectric fluids in electrical generators and capacitors.[5] These same chemical properties are responsible for PCBs becoming one of the most persistent and ubiquitous toxic wastes in our air, soil and water. Of particular importance from a public health perspective, is the bioaccumulation of PCBs in the food chain, and the resultant health hazards which that presents.

Health Factors Relating to Disposal:

Considerable scientific evidence has been gathered on the toxic effects of PCBs, particularly the higher chlorinated biphenyls. Epidemiological studies were done of the "Yusho" poisoning of 1,000 people in Japan who consumed PCB contaminated rice oil. The documented toxic effects included an acne-like skin eruption (called chloracne), pigmentation of skin and nails, excessive eye discharge and swelling, nausea and digestive disturbances. Longer term studies indicated increased reproductive abnormalities including sterility, increased stillbirths, and infant deformity.[1, 15] North American studies have subsequently documented the human health effects of fish consumption, contaminated drinking water, PCB contaminated dairy milk and eggs, and the migration of PCBs from packing materials.[16, 17] Occupational and environmental studies have confirmed the threats to health. The carcinogenic effects of PCBs, particularly at high doses has also been the subject of empirical investigation.[1, 4]

The documentation of these hazards has resulted in increasingly prohibited use of PCBs throughout the world. In Canada, use is now legally restricted to closed-cycle electrical transformers and capacitors.

However, little scientific research has been done on human health responses to low level PCB exposures such as in quantities emitted in the incineration disposal process, or quantities to which we are exposed in daily contact with PCBs in our environment. Serious public concerns continue to be raised on this lack of scientific information of health effects of low level PCBs. Given the volume of PCB wastes to be disposed of in the next 40 years, it has become an important element in the disposal debate.

The National Research Council of Canada (NRCC) undertook an extensive review of the scientific literature of PCB health effects in 1976. In its report it stressed the urgent need to establish patterns of toxic activity, particularly in lifetime exposures to low level emissions and to the Lower Chlorinated Biphenyls (LCBPs). It called for a definition of toxicity pattern to be established prior to the establishment of environmental criteria with respect to PCB toxicity, and prior to further conscious releases of PCBs, however small, into the environment.[4]

The public health *effects of* low level exposure to PCBs by humans relate to emission levels both from the incineration process and from spills or accidental releases of concentrated levels of PCB waste materials. It appears that these effects must be researched before a responsible decision can be made by the political process. In particular epidemiological studies which examine the health effects of low levels of PCBs through past spills, leakages and occupational exposure would have provided the basis for a more intelligent evaluation of toxicity and the threat to public health.

Specific Recommendation:

1. Scientific research must be undertaken to determine the human health effects of low level PCB exposure, and of lifetime accumulation of PCB exposure, before approval is given to any disposal process.

Levels of PCBs in Ontario:

PCBs are present in all environmental media and occur in elevated levels in most urban and industrial centres. Municipal sewage systems all contain PCBs, from largely unidentified sources.[2] PCB content in waste oils spread on rural roads as a dust suppressant has also been a source of public concern, and studies are underway now to study contamination from run off into agricultural fields, airborne dusts and uptake in plants.[7] Fish contamination is widespread, and Health and Welfare Canada has imposed consumption guidelines of 2 parts per million PCB. Airborne transportation of PCBs through precipitation and particle deposits are potentially very dangerous depending upon levels of PCBs released to the environment in the near future.[2] There are largely undocumented amounts of PCB entering the environment through accidental leakage or illegal dumping.

Current inventories are now being documented (under requirement of federal legislation) for commercial users of materials with more than 100 parts per million PCB. The August 1979 inventory figures are:[5]

	Quantity of PCB in use (kg)	Quantity of PCB in storage for use (kg)	Quantity of PCB in storage for disposal (kg)
Ontario	8,398,073	258,643	408,364
Total in Canada	15,444,548	407,577	448,756

It is clear that Ontario has the largest quantities of PCBs, 54% of the Canadian total. 99.75% of PCBs registered are in current use. 92.64% of those materials are contained in electrical equipment, transformers and capacitors. Public utilities are the largest consumers, 25.18% of the total inventory.[5] Metro Toronto and region have 36% of the Ontario total of PCB materials in transformers which will require disposal in the next few years, a significant proportion of the total.[8]

Disposal of PCBs:

No commercial facilities currently exist in North America for the destruction of waste PCBs. In addition to the Mississauga Hearings, similar applications for incineration are being contested in New Jersey, Texas and Arkansas. Formerly, quantities of materials were being hauled across the border for land disposal in the United States. The U.S. closed its borders to liquid bulk PCB hauling several years ago. The termination deadline for transportation of contaminated solids is May 1, 1980; an extension of that date is currently under negotiation between Federal Environmental Protection Services and the American Environmental Protection Agency.

Since this no longer presents a solution to the disposal problem, both the federal and provincial government have been involved in efforts to dispose of PCBs within Canada. The debate about the disposal site at Mississauga has arisen out of this.

Cement Kiln Process as a Means of Disposal:

There is little debate that high temperature incineration as a means of PCB destruction is the only technology commercially in production at this point in time, effecting a 99.9% destruction of incinerated PCB wastes. The Ontario Ministry of the Environment adopted criteria for actual destruction of PCBs; a two second dwell time at 1200°C with 3% excess oxygen, or a 1.5 second dwell time at 1600°C with 2% excess oxygen.[9] The cement kiln was considered a logical commercial adaptation of this incineration technology because temperatures and gas residences times under normal operation exceed these guidelines for PCB destruction. The St. Lawrence Cement Company in Mississauga was considered because it is an operational facility and can use PCB wastes as supplementary fuel in the production of low alkali cement. It is not the technology itself, but rather the surrounding factors affecting the disposal of PCBs, which present major concerns. These major concerns include emissions and transportation of waste materials.

Emissions:

It is of great importance to the public's health that the projected emissions from St. Lawrence Cement are in fact monitored. The monitoring of ambient air emissions is a complex technology. The TAGA 3000 is the Ministry of Environment's most developed monitoring system and will be the principle equipment used should approval be given to the cement kiln process in Mississauga. This raises a number of concerns.

The TAGA 3000 is calibrated to monitor a number of toxic substances, and can be programmed to monitor almost simultaneously PCB and other chemical emissions. However, the Ministry of Environment has not planned to monitor for potentially hazardous emissions in addition to PCBs at the St. Lawrence site.[10] Safeguards to ensure other toxic substances are not emitted into the air during PCB incineration should be a necessary prequisite in approval of the St. Lawrence or any application. Secondly, the TAGA 3000 is calibrated to monitor only 12 of the possible 80 commercial compounds of PCB.[10] Higher emission levels of other PCB compounds could conceivably be released during the incineration process, and not be detected.

Finally, we are concerned that actual monitoring of stack gas emissions will not take place frequently enough. An emissions test is currently planned to be spread over a two week period, one hour each day. If the incineration process is approved, a similar testing will be done perhaps twice each year with the TAGA 3000 system. The actual number of tests per annum has not yet been determined by the Ministry of Environment; thus there are not even guarantees of this frequency of monitoring.[10] Needless to say, health hazards from changes in emissions levels could go undetected for a considerable length of time.

In Addition, there have been continuing technical problems related to the TAGA 3000 and the flue connection to St. Lawrence cement kiln.[10] Until these problems are corrected, there can be no guarantees of proper monitoring of any emissions.

In 1979, the federal government convened the "Technical Task Force on the Use of Cement Kilns for the Destruction of Liquid PCBs" to examine technical requirements to ensure safe destruction of PCBs in the cement kiln process. Some members of that Task Force submitted a dissenting report expressing concern that public health factors relating to emissions had not been properly examined.11

Specific Recommendations:

1. Technology should first be in place to simultaneously monitor for other toxic substances emitted during PCB incineration.

2. Monitoring technology must first be improved to ensure accurate emissions testing.

3. Guaranteed frequency of tests should be given to residents of Mississauga before approval of the St. Lawrence process.

4. Emissions of PCBs must be studied more carefully as to potential public health effects.

Transportation of Waste Materials:

Transportation is related to our concerns as a Local Board of Health, because current legislative protection falls short of properly safeguarding the public interest. Some of the largest risks in disposal are in the potential of spillage during transportation of waste materials. Of the 47 documented PCB spills in Canada since 1975, 11 occurred in transit.[8] Transportation regulations fall under a maze of laws and regulatory bodies. At the federal level such bodies include the Canadian Transport Commission, the Federal Department of Transport, The Marine Administration, and the Air Administration The Provincial level has a similar complex set of regulatory bodies. It appears that in some respects there is much overlap, in others there is a lack of controls over PCBs.

To illustrate, current licensing of liquid PCB waste haulers does not specify regulations regarding standards of packaging, labelling or vehicle type. A government commissioned report released December 1979 raised the current high risks of PCB release during transportation, and called for strict regulations to reduce hazards of PCB haulage. These dangers to public health from lack of regulatory control must be corrected prior to implementation of the incineration process, and the resultant increased transportation of PCB wastes.

A federal Task Force was established in 1979 to investigate, among other things, transportation safety requirements for the use of cement kiln incineration of PCBs. According to the federal Senior Contaminants Officer, this task force never met.[12]

There is also a lack of regulations regarding volatile and highly contaminated fluids used to clean out PCB filled equipment. These highly combustible materials are not subject to the scrutiny of the Gasoline Handling Code. Although the Ontario Fire Code and Federal Transport of Dangerous Goods Code currently under legislative debate will in part regulate these fluids, the controls are neither complete nor in place.[8] Most importantly, there is no provincial framework to enforce transport requirements should they be developed.

The use of PCB as a supplementary fuel at St. Lawrence Cement requires sustained high levels of low chlorine content wastes to dilute PCB wastes to a content of less than 10% chlorine. This is a necessary requirement of the kiln operation, or else there is danger of increased emissions of particulate matter.[2] These wastes will be imported from the United States, increasing existing transportation hazards at a time when provincial regulations are still inadequate.

Specific Recommendations:

1. Uniformed standards of PCB waste haulage including vehicle type and labelling requirements should be legislated.

2. PCB liquids should be separated from volatile PCB contaminated solvents during transportation.

3. Enforcement procedures need to be developed to ensure safe haulage, once these standards are in place.

Public Accountability:

There are two aspects to accountability in the disposal debate; (1) public access to information, and (2) the guarantee that the public health will not be threatened by liability disputes in the case of spills or accidental leakage of PCBs into the environment. Of the 47 documented spills since 1975, 32 were from electrical equipment in use, 4 from equipment and liquids in storage. Spill volumes on average have been approximately 200 litres, and are caused primarily by damage in handling or storage.[8]

The public concern over liability and the need for swift clean up procedures is not unfounded. For example, the 1973 PCB spill in Dowling, Ontario of 5,000 litres of Askarel has taken years of court action to resolve liability. Only in 1980 when the town's water supply is threatened, are permanent measures being taken to remove the remaining contaminated soils and contain movement of the PCBs.

Secondly, there are concerns regarding the right of public access of information relating both to changes in emissions levels, and to possible related health hazards. To cite again the 1973 Dowling spill, residents were being informed as late as January 1979 that there were no dangers to the water table.[13]

Specific Recommendations:

1. There should be legislative guarantees that clean up procedures take place before liability is determined in the event of PCB spills.

2. The right of speedy acess to leakage or spill information should be guaranteed to the public.

Alternatives for PCB Waste Disposal:

Given the uncertainties in transportation and regulation relating to the use of the cement kiln process of burning PCBs, we recommend a public and scientific scrutiny of other disposal methods. It is unfortunate that the

Commission of Inquiry into the St. Lawrence proposal will not include in its terms of reference the examination of alternatives to the cement kiln method of PCB waste disposal. It is not appropriate for this report to undertake a technical discussion of the alternatives, since it does not fall within the mandate or expertise of the health advocacy unit. However, it is important as public health professionals that we call for consideration of those alternative methods which can potentially eliminate the threats to public health and safety raised in the text of this report.

For example, the plasma process developed by scientists at the Royal Military College appears to present safer and more cost effective means of destroying PCB waste materials.[14] It has several distinct advantages over the incineration process. The plasma process is housed in compact machinery because of its original use for shipboard waste disposal. This creates the potential for small, on site reactors for PCB waste disposal, eliminating the dangers of waste transportation to the disposal site. This process also potentially provides a disposal solution to PCB contaminated solids, which is not available with the incineration technology. In addition the emissions monitoring appears to be a more precise technology.

The Royal Military College is but one of the alternative disposal methods currently being developed. One must question the appropriateness of the cement kiln technology if on site, more cost effective methods are soon to be available. This report cannot judge either the efficiency or commercial viability of these alternatives; however, it can support the scientific community's requests to give these alternatives full consideration in public, prior to approval of a cement kiln process.

Specific Recommendations:

1. The cement kiln process at St. Lawrence should not be approved until full public and scientific scrutiny have been given to potentially safer disposal alternatives.

Other Considerations:

There are a number of additional health related issues which are appropriate to raise in concluding.

We believe inadequate information still exists about PCBs, particularly exposure in the workplace. For example, Hydro workers exposed to capacitors and laboratory workers exposed to PCB immersion oils, have not always been fully warned as to the hazards relating to PCB exposure. While we believe the highest priority is the removal of PCBs from the workplace entirely, we are concerned that proper equipment and training be available to those already exposed on a day-to-day basis to this toxic substance. We applaud the Ministry of Labour's initial efforts to educate emergency workers on the toxicity and handling of PCBs; however we urge that these efforts be greatly expanded to educate all workers exposed to PCB materials in the workplace.

The lack of scientific research on the effects of low level exposure of PCBs has resulted in the Ministry of Labour maintaining higher threshold levels of occupational exposure than established by the U.S. National Institute for Occupational Health and Safety. Since the benefit of the doubt should go to the worker at risk, the provincial government should be urged to lower threshold levels in its established guidelines.

Finally, we are concerned about the expenditure of public resources on a disposal technology that leaves unresolved a broad range of questions related to potential hazards to public health. Provincial and federal resources should be directed equally at investigation of disposal alternatives of PCBs and removal of the health hazard itself from use in electrical generators. The oft cited rationale for proceeding with the St. Lawrence proposal is that unknown amounts of PCBs are being disposed of illegally; yet there is little evidence that regulatory bodies are attempting to control this dumping. Now that the federal government is compiling an inventory of PCB materials, it could utilize this information to ensure proper interim disposal of PCB materials when records show that a particular transformer or capacitor is nearing end of service life.

Most importantly, polychlorinated biphenyls are but one small class of chemicals which have been introduced into our social and work environment. Most of the concerns related to transportation, regulation and public accountability of PCBs are directly applicable to the thousands of toxic substances which threaten public health. Research on health effects and stronger legislative controls to the use of these substances is the most critical concern to be stressed. Removal of the hazards themselves should be given the highest of priorities in the development of environmental strategies for public health.

Suggested General Recommendations:

1. The Local Board of Health should convey to the provincial and federal governments its concern about the unresolved matters in the question of PCB disposal. In particular, there is a lack of legislative guarantees of safe transportation, emission monitoring, public information, liability and jurisdictional responsibilities surrounding the disposal process.

2. The Local Board of Health should stress to these legislative bodies the need for vastly increased public funding of scientific research relating to the human health effects of low level and chronic exposure of PCBs. This is an absolute priority in resolution of the debate on PCB disposal.

3. The Local Board of Health recommends against the approval of the cement kiln incinerator process, until both of these considerations are met. This is the only means of safeguarding the public's health in the vacuum of knowledge of human health hazards, and in the unclarified myriad of jurisdictional responsibilities for safe disposal.

4. The Local Board of Health recommends that no disposal process be approved until a mechanism is in place to scientifically evaluate the health hazards of the technology, to the population residing in the vicinity of a disposal site. Epidemiological studies should be conducted of resident populations proximate to known spills and leakages in Canada.

Appendix

Organizations represented in Mississauga Hearings under the Public Inquiries Act on the disposal of liquid PCBs at St. Lawrence Cement*:

City of Mississauga, David Estrin, Solicitor

Waste Management Branch, Ministry of Environment, Linda McCaffery, representing

Canadian Environmental Law Association, Mr. Edwards

PCB Working Group, Ontario Chapter of the Canadian Society of Environmental Biologists, Mr. Bendell, Chairman

Meadowwood - Rattray Residents Association

Owenwood Residents Association

Institute of Environmental Studies, M.S. Rudolph

Federation of Ontario Naturalists

NDP Environment Critic, Marion Bryden, MPP Beaches-Woodbine

R.D. Kennedy, MPP Mississauga South

Peel Board of Health, Regional Municipality of Peel

Park Royal Community Association

Bramblewood Lane Residents Association

Council of South Mississauga Community Association

* Source: Harold Brown, advisor to Mississauga hearings, Environmental Assessment Board

References

1. World Health Organization, Environmental Health Criteria: Polychlorinated Biphenyls and Terphenyls, Geneva, 1976.

2. Ministry of Environment, Director's Report to the Environmental Assessment Board Regarding the Burning of PCBs at St. Lawrence Cement, 1978.

3. Canada Gazette, Regulations under the Environmental Contaminants Act, Part 1, 1977.

4. National Research Council of Canada, Polychlorinated Biphenyls, Ottawa, 1976.

5. Environment Canada, Environmental Protection Service, Distribution of PCBs in Ontario, Toronto, 1979.

6. Environmental Contaminants Committee, Environment Canada and Health and Welfare Canada, Background to the Regulation of Polychlorinated Biphenyls in Canada, 1976.

7. Ministry of the Environment, Interim Guidelines Respecting Polychlorinated Biphenyls in Waste Oils, 1978.

8. Dillon, M.M. Ltd., Consultants for the Ontario Ministry of the Environment, Facilities for the Storage of PCB Wastes, 1979.

9. Fisheries and Environment Canada, EPS, Guidelines for the Management of Waste Materials Containing PCBs, Report EPS, 1-EC-78-1.

10. Interview, D. Helliwell, Assistant Director, Information Services, Ministry of the Environment. Confirmed Mr. B. French, Sci-ex.

11. Canadian Environmental Law Association, Pollution Probe, Minority Opinion to the Technical Task Force Report on the Use of Cement Kilns for the Destruction of Liquid PCBs, 1979.

12. Interview, Rick Findlay, Senior Contaminants Officer, Environmental Protection Service, Environment Canada.

13. Hansard, Legislature of Ontario Debates, 1973 - 1979.

14. Major Barton, Scientist, Royal Military College, Kingston.

15. Calabrese E.J. and Sorenson A.J., The Health Effects of PCBs with Particular Emphasis on Human High Risk Group, Reviews on Environmental Health, II, 4, 1977.

16. Stanovick, R.V. et al, Determination of Polychlorinated Biphenyls (Aroclor 1242) Migration into Food Types, Bulletin Environmental Toxicology, 10: 101, 1973.

17. Ahmed, A.K., PCBs in the Environment, Environment, S8: 6, 1976.

18. Cordle, F. & Kolbye, A., Food Safety and Public Health, Cancer, 43: 2143-2150, 1979.

19. Wassermann, M., Wassermann, D., Cucas, S., & Miller, H.J., World PCBs Map: Storage and Effects in Man and his Biological Environment in the 1970's, Annals New York Academy of Science, 77: 320, 1979.

Passed unanimously May 2, 1980.

PCB dispos

Re #10.

Recommendations continued:

5. The Chairman of the Local Board of Health write to the Minister of the Environment to solicit answers to these specific concerns:

   1) Will the Ministry guarantee that no further transportation of PCB wastes to storage or disposal sites will take place until the Government has introduced legislation safeguarding the public's interest against leakage or spillage, specifically that such legislation will include:

      i) rigid specifications on type of transport containers, including the separating of PCBs liquids from highly flammable solvents, during transportation;

      ii) requirements for proper labelling of materials;

      iii) requirement to make public the transportation routes of such substances, with proper notification to local fire and police and Public Health authorities on handling procedures;

      iv) mandatory clean up requirements of PCB materials immediately after an accidental spill;

      v) clear liability for those commercially involved in transport of this substance to assume responsibility for any accidents in handling, storage, disposal or transportation;

      vi) vastly increased co-ordination and simplification of the cumbersome provincial and federal legislation regulating transportation of waste materials.

2) Is the Ministry prepared to assure the public and public health officials greater access to information relating to PCBs including:

   i) notification of all inventory of PCBs within this municipality and projected date of end of service life

   ii) immediate notification of any accidental release of PCBs by spill, leakage or increased incinerator emissions, to the public and to public health officials.

3) The TAGA 3000 is clearly capable of monitoring for other toxic substances as well as PCB emissions, yet both Ministry officials and scientists at Sciex state that the Minister has made no decision to monitor for such substances or for PCB compounds other than 12 of the possible 80 commercial compounds. Is the Minister prepared to guarantee monitoring of other toxic substances to safeguard the public's health should the St. Lawrence proposal proceed?

4) Can the Minister promise definite numbers of monitoring tests which will be undertaken each year, and is the Minister prepared to release the results of those tests to the public?

5) What attempt is the Ministry making to monitor storage of existing PCB and PCB contaminated solids which are projected to be disposed of? Is the Ministry co-ordinating these efforts to the federal PCB inventory of materials in Ontario? What action is being taken to ensure these materials are not being illegally dumped at the end of their service life?

6) Why has the Ministry consistently refused to donate resources to the further development and testing of potentially safe and most cost effective alternatives to the cement kiln process? Can the Ministry give us some assurance that the public's health will be further considered before resolving the disposal debate, specifically that alternatives such as the Royal Military College's PCB disposal method will be allowed fair consideration by the Ministry and the public?

7) Is the Minister prepared to ask the Ontario Government to finance much needed research into the human health effects of low level and chronic exposure of PCBs?

8) Will the Minister endeavor to request the government to conduct epidemiological studies of populations surrounding all spill or incinerator sites, to monitor to health effects of exposure to PCBs, to provide a more scientific evaluation of the human health hazards related to such exposure?

9) Can the Ministry tell us what steps are currently being taken to ensure the removal of PCBs from the workplace, specifically hazards facing hydro workers and laboratory technicians working with microscope immersion oils? Can the Ministry explain what educational programs are in progress or planned to warn workers of the hazards in handling these materials?